shows a remarkable difference between the two collections, and taken with the facts shown in the table leads the writer to identify the 1917 collection as *S. Weberi* Keutz.

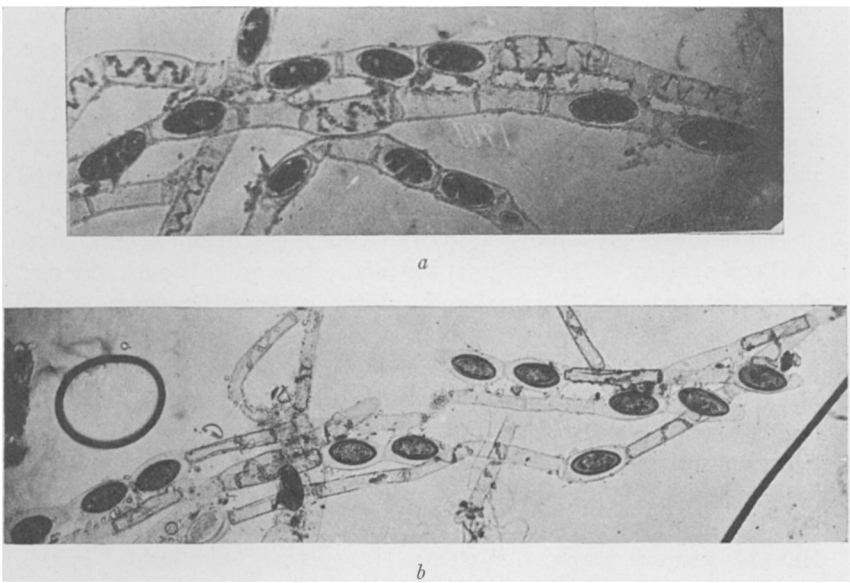

FIG. 1.—*a*, *Spirogyra Weberi*; *b*, *S. inflata*

These differences are shown in fig. 1, from preparations made at the same magnification, in the same mounting media of identical concentration.—BERT CUNNINGHAM, *Trinity College, Durham, N.C.*

AN ENDEMIC BEGONIA OF HAWAII

The flora of the Hawaiian Archipelago exhibits many pronounced peculiarities. Among these the high endemism, nearly 85 per cent of the spermatophytes, is noteworthy and unexcelled. One of the specific instances of endemism, very interesting to the student of plant distribution, is the solitary begonia, *Hillebrandia sandwicensis* Oliver. This lone species, sharply precinctive in its zonal range, is undoubtedly a vestige of an ancient flora more primitive than that which the islands now possess. Its presence in our flora constitutes one of the many evidences, floral, faunal, and geological, that at one time in the history of the

Pacific Basin the Hawaiian Islands were much more closely associated with the Andean and South Pacific regions than they are at present.

The Begoniaceae comprise 4 genera, of which two are monotypic. *Begonia*, with 400–500 species in tropical and subtropical countries, gives the family its name and definition. *Begoniella* has 3 species in Colombia. *Symbegonia* in New Guinea and *Hillebrandia* in Hawaii are monotypic and little known. As BAILEY[1] remarks, "The begonias are exceedingly variable, the genus running into about 60 well-marked sections, but the intergradations are so many and the essential floral characters so constant that it is impracticable to break up the great group into separate genera."

Considering the family as a whole, it is practically absent from the Pacific region. The two great begonia regions are (1) South America along the Andes to Mexico; and (2) the eastern Himalayas southeastward to the Malay Peninsula. With the exception of the two vestigial and little-known species, one in New Guinea and the other in Hawaii, the entire family is now without representation in the far-scattered island groups of the southern, equatorial, and northern Pacific biological provinces.

The genus and species found in Hawaii was described by OLIVER (Trans. Linn. Soc. **25**:361. *pl. 46*). The generic name is in honor of Hawaii's greatest botanist, WILLIAM HILLEBRAND, who resided in the islands for many years, made an exhaustive study of the land flora, and was the author of *Flora of the Hawaiian Islands* (1888). *Hillebrandia* differs from *Begonia* in having the ovary free in its upper third, and in bearing petaloid organs in the female flowers; in all other features it strongly resembles the true begonias.

This beautiful and interesting plant is confined to the montane rain forest zone. It occurs on all the larger islands of the group, with the exception of Hawaii, from which it has not been recorded. Its altitudinal range is from 3000 to 6000 ft. The islands of Kauai and Maui appear to possess this plant in greatest abundance; it is common in the upper levels of the former, and occurs in practically all of the wet ravines of West Maui and Hale-a-ka-la. In the Koolau Gap of Mount Hale-a-ka-la it attains perfection and a height of 6 ft. On the windward precipices of the island of Molokai it forms a beautiful drapery, and is very showy, although the individual plants are not as fine as those which grow in more sheltered localities. On Oahu it is very rare, and is restricted to the upper levels of Mount Ka-ala, and a few spots in the Punaluu Mountains. It is very shade tolerant and is usually found in

[1] BAILEY, L. H., Standard cyclopedia of horticulture.

the vicinity of waterfalls or in the depths of narrow, sunless ravines. In many of its ecological characters it resembles the endemic *Gunnera petaloidea.*

The native Hawaiian name for *Hillebrandia* is *Pua-maka-nui,* literally "the flower with the big eyes," referring to the large, showy flowers, which contrast strongly with the gloom of its habitat. On the island of Kauai it is known as *Ala-aka-awa;* the Kauai natives use many names and words which are used in no other parts of the islands. The rhizomes of many begonias, particularly those of South America, are bitter and astringent, and are used medicinally by the natives of those countries. It does not appear that the primitive Hawaiians used *Hillebrandia* in any way, although it should be stated that much of the medicinal lore of ancient Hawaii has been irrevocably lost.—VAUGHAN MACCAUGHEY, *College of Hawaii, Honolulu.*

SECONDARY PARASITISM IN PHORADENDRON

BROWN'S[1] illustration of *Phoradendron californicum* parasitic on *P. flavescens*[2] has a twofold interest. First, it records a case of secondary parasitism which seems to be very rare indeed. It has never, so far as I am aware, been noted by workers at the Desert Botanical Laboratory, a number of whom have been especially interested in parasitism. For the most part *P. macrophyllum* and *P. californicum* occur on quite different hosts.[3] Second, the case is of interest physiologically, as BROWN suggests, in its relation to osmotic and other physical phenomena. HARRIS and LAWRENCE, in their study of the sap properties of Jamaican montane rain forest Loranthaceae,[4] find that in these forms the sap extracted from the green stems of the leafless species shows lower osmotic concentration than that from the foliar tissues of the leafy forms. Thus in working with 7 species of Loranthaceae they found average values of the freezing point lowering of 1.153°, 1.176°, and 1.177° in the leafless species as compared with 1.305°, 1.347°, 1.400°, and 1.650° in

[1] BROWN, J. G., Mistletoe vs. mistletoe. BOT. GAZ. **65**:193. *fig. 1.* 1918.

[2] This is presumably *P. macrophyllum* Cockerell, the *P. flavescens macrophyllum* of ENGLEMANN and of some subsequent workers, or one of its varieties. The host here, as Professor BROWN has kindly written me, was a *Fraxinus.*

[3] TRELEASE (The genus *Phoradendron,* p. 14, Urbana. 1916) notes that *P. californicum,* while occurring exclusively on angiosperms, belongs to a group, the "Pauciflorae," which with this and one other exception is limited to coniferous hosts.

[4] HARRIS, J. ARTHUR, and LAWRENCE, J. V., On the osmotic pressure of the tissue fluids of Jamaican Loranthaceae parasitic on various hosts. Amer. Jour. Bot. **3**:438–455. 1916.